

IN THE CLAIMS

1. (Previously Presented) A non-naturally occurring composition comprising a plurality of unaggregated nucleic acid complexes, wherein individual complexes of said plurality consist essentially of a single nucleic acid molecule and one or more polycation molecules, wherein said complexes are formed by mixing said nucleic acid molecule and said polycation molecules, wherein prior to mixing said polycation molecules have a counterion selected from the group consisting of acetate, bicarbonate, and chloride, wherein a subset of said complexes are rod-shaped when visualized by transmission electron microscopy, wherein the rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy, wherein the nucleic acid molecules of the rod-shaped complexes are condensed, and wherein said complexes are colloidally stable in normal saline.

2. (Original) The composition of claim 1 wherein the polycation molecules are polylysine or a polylysine derivative.

3. (Original) The composition of claim 2 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

4. (Original) The composition of claim 1, wherein said rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

5. (Original) The composition of claim 1, wherein the rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

6-7. (Canceled)

8. (Previously Presented) A non-naturally occurring composition comprising a plurality of unaggregated nucleic acid complexes, wherein individual complexes of said plurality consist essentially of a single nucleic acid molecule and one or more polycation molecules, wherein said complexes are formed by mixing said nucleic acid molecule and said polycation molecules, wherein prior to mixing said polycation molecules have a counterion selected from the group consisting of acetate, bicarbonate, and chloride, said polycation molecules having a nucleic acid binding moiety through which they are complexed to the nucleic acid, wherein said nucleic acid molecule encodes at least one functional protein, wherein a subset of said complexes are rod-shaped when visualized by transmission electron microscopy, wherein the rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy, wherein the nucleic acid molecules of the rod-shaped complexes are condensed, and wherein said complexes are colloidally stable in normal saline.

9. (Original) The composition of claim 8 wherein the polycation molecules are polylysine or a polylysine derivative.

10. (Original) The composition of claim 9 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

11. (Previously Presented) The non-naturally occurring composition of claim 8 wherein said nucleic acid molecule comprises a promoter which controls transcription of an RNA molecule encoding the functional protein.

12. (Previously Presented) The non-naturally occurring composition of claim 8 wherein the protein is therapeutic.

13. (Previously Presented) The non-naturally occurring composition of claim 8 wherein the rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

14. (Previously Presented) The non-naturally occurring composition of claim 8 wherein the rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

15-16. (Cancelled)

17. (Previously Presented) A non-naturally occurring composition comprising a plurality of unaggregated nucleic acid complexes, wherein individual complexes of said plurality consist essentially of a single double-stranded cDNA molecule and one or more polycation molecules, wherein said complexes are formed by mixing said nucleic acid molecule and said polycation molecules, wherein prior to mixing said polycation molecules have a counterion selected from the group consisting of acetate, bicarbonate, and chloride, wherein said cDNA molecule encodes at least one functional protein, wherein a subset of said complexes are rod-shaped when visualized by transmission electron microscopy, wherein the nucleic acid molecules of the rod-shaped complexes are condensed, wherein the rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy, and wherein said complexes are colloidally stable in normal saline.

18. (Original) The composition of claim 17 wherein the polycation molecules are polylysine or a polylysine derivative.

19. (Original) The composition of claim 18 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

20-25. (Cancelled)

26. (Previously Presented) A non-naturally occurring composition comprising a plurality of soluble compacted complexes of a nucleic acid molecule and one or more polycation molecules, wherein a subset of said complexes are rod-shaped when visualized by transmission electron microscopy, wherein the rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy, wherein individual complexes of said plurality consist essentially of a single nucleic acid molecule and one or more polycation molecules, wherein the nucleic acid molecules of the rod-shaped complexes are condensed, wherein said complexes are colloidally stable in normal saline, wherein said complexes are made by the process of:  
mixing a nucleic acid with a polycation having acetate as a counterion, at a salt concentration sufficient for compaction of the complexes.

27. (Cancelled)

28. (Previously Presented) A non-naturally occurring composition comprising a plurality of soluble compacted complexes of a nucleic acid molecule and one or more polycation molecules, wherein a subset of the complexes are rod-shaped when visualized by transmission electron microscopy, wherein the nucleic acid molecules of the rod-shaped complexes are condensed, wherein the rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy, wherein individual complexes of said plurality consist essentially of a single nucleic acid molecule and one or more polycation molecules wherein said complexes are colloidally stable in normal saline, wherein the complexes are made by the process of:  
mixing a nucleic acid molecule with polycation molecules having acetate as a

counterion in a solvent to form a complex, said mixing being performed in the absence of added salt, whereby the nucleic acid forms soluble complexes with the polycation molecules without forming aggregates.

29. (Cancelled)

30. (Previously Presented) The composition of claim 26 wherein the polycation molecules are polylysine or a polylysine derivative.

31. (Previously Presented) The composition of claim 30 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

32.-33. (Cancelled)

34. (Previously Presented) The composition of claim 28 wherein the polycation molecules are polylysine or a polylysine derivative.

35. (Previously Presented) The composition of claim 34 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

36.-37. (Canceled)

38. (Original) The composition of claim 17 wherein the nucleic acid complexes are associated with a lipid.

39. (Original) The composition of claim 17 wherein said rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

40. (Original) The composition of claim 17 wherein the rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

41.-50. (Cancelled)

51. (Original) The composition of claim 1 wherein said polycation molecules are CK15-60P10 and the counterion is acetate, wherein CK15-60P10 is a polyamino acid polymer of one N-terminal cysteine and 15-60 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 10 kdal is attached to the cysteine residue.

52. (Original) The composition of claim 51 wherein the polycation molecules comprise 30 residues of lysine.

53. (Original) The composition of claim 51 wherein the polycation molecules comprise a targeting moiety.

54. (Original) The composition of claim 51, said rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

55. (Original) The composition of claim 51, wherein the rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

56-57. (Cancelled)

58. (Original) The composition of claim 51 which is lyophilized.

59. (Original) The composition of claim 51 which is rehydrated after lyophilization.

60. (Original) The composition of claim 51 which does not contain a disaccharide.

61. (Original) A method of delivering polynucleotides to cells comprising:  
contacting the composition of claim 59 with cells, whereby the nucleic acid is delivered to and taken up by the cells.

62. (Original) The method of claim 61 wherein the composition does not contain a disaccharide.

63. (Original) The composition of claim 8 wherein the polycation molecules are CK15-60P10, and the counterion is acetate, wherein CK15-60 is a polyamino acid polymer of one N-terminal cysteine and 15-60 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 10 kdal is attached to the cysteine residue.

64. (Original) The composition of claim 63 wherein the polycation molecules comprise 30 residues of lysine.

65. (Original) The composition of claim 63 wherein the polycation molecules comprise a targeting moiety.

66. (Original) The composition of claim 63 which is lyophilized.

67. (Original) The non-naturally occurring composition of claim 63 wherein said nucleic acid molecule comprises a promoter which controls transcription of an RNA molecule encoding the functional protein.

68. (Original) The non-naturally occurring composition of claim 63 wherein the protein is therapeutic.

69. (Original) The non-naturally occurring composition of claim 63 wherein the rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

70. (Original) The non-naturally occurring composition of claim 63 wherein the rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

71-72. (Cancelled)

73. (Original) The composition of claim 63 which is rehydrated after lyophilization.

74. (Original) The composition of claim 63 which does not contain a disaccharide.

75. (Original) A method of delivering polynucleotides to cells comprising:  
contacting the composition of claim 73 with cells, wherein the polynucleotide encodes a protein, whereby the protein is expressed.

76. (Original) The composition of claim 17 wherein said polycation molecules are CK15-60P10, and said counterion is acetate, wherein CK15-60P10 is a polyamino acid polymer of one N-terminal cysteine and 15-60 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 10 kdal is attached to the cysteine residue.

77. (Original) The composition of claim 76 wherein the polycation molecules comprise 30 residues of lysine.

78. (Previously Presented) The composition of claim 76 wherein the polycation molecules comprise a targeting moiety.

79. (Previously Presented) The composition of claim 76 which is lyophilized.

80. (Previously Presented) The composition of claim 76 which is rehydrated after lyophilization.

81. (Previously Presented) The composition of claim 76 which does not contain a disaccharide.

82. (Original) A method of delivering polynucleotides to cells comprising:  
contacting the composition of claim 80 with cells, wherein the polynucleotide encodes a protein, whereby the protein is expressed.

83.-102. (Cancelled)

103. (Original) The composition of claim 8 wherein the nucleic acid complexes are associated with a lipid.

104. (Previously Presented) The composition of claim 17 wherein the nucleic acid complexes are associated with a lipid.

105. (Cancelled)

106. (Previously Presented) The composition of claim 26 wherein the complexes have a length of 100-300 nm.

107. (Previously Presented) The composition of claim 26 wherein the complexes have a length of 100-200 nm.

108-113. (Cancelled)

114. (Previously Presented) The composition of claim 28 wherein the complexes have a length of 100-300 nm.

115. (Previously Presented) The composition of claim 28 wherein the complexes have a length of 100-200 nm.

116.-121. (Cancelled)

122. (Original) The method of claim 75 wherein the composition does not contain a disaccharide.

123. (Cancelled)